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Kjellberg

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(54) **SPRINKLER AND METHOD FOR TESTING A SPRINKLER**

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A62C 31/07	(2006.01)
A62C 35/58	(2006.01)

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CPC ***A62C 37/50*** (2013.01); ***A62C 31/07*** (2013.01); ***A62C 35/58*** (2013.01)

(58) **Field of Classification Search**

USPC 169/37, 43

See application file for complete search history.

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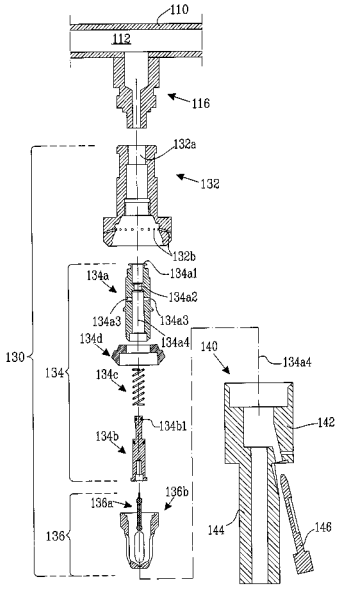
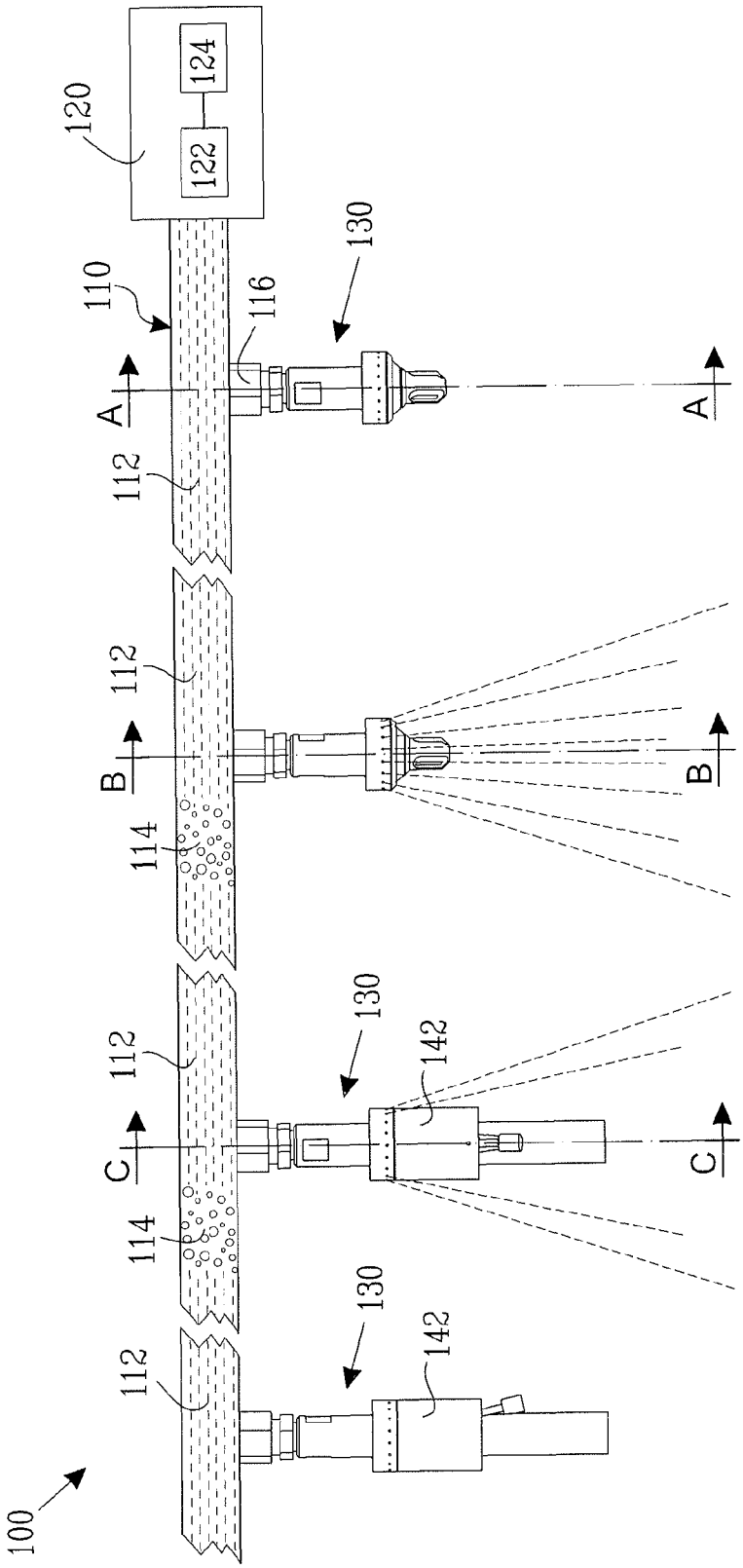
(57) **ABSTRACT**

A sprinkler head and a method for testing the sprinkler head, including an inlet device to lead fire-extinguishing medium and air from a distribution system into the sprinkler head, an outlet device to release fire-extinguishing medium and air from the sprinkler head, a flow passage to lead fire-extinguishing medium and air from the inlet device to the outlet device, a valve to be held in first non-activated state by a triggering device in the sprinkler head, so the flow passage is closed, and in activated state to open the flow passage, when the triggering device is activated in a heated state, so air and fire-extinguishing medium may flow from the inlet device to the outlet device. The valve in a second non-activated test state operatively opens the flow passage, so air and fire-extinguishing medium may flow from the inlet device through the flow passage and out through the outlet device.

12 Claims, 8 Drawing Sheets

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C
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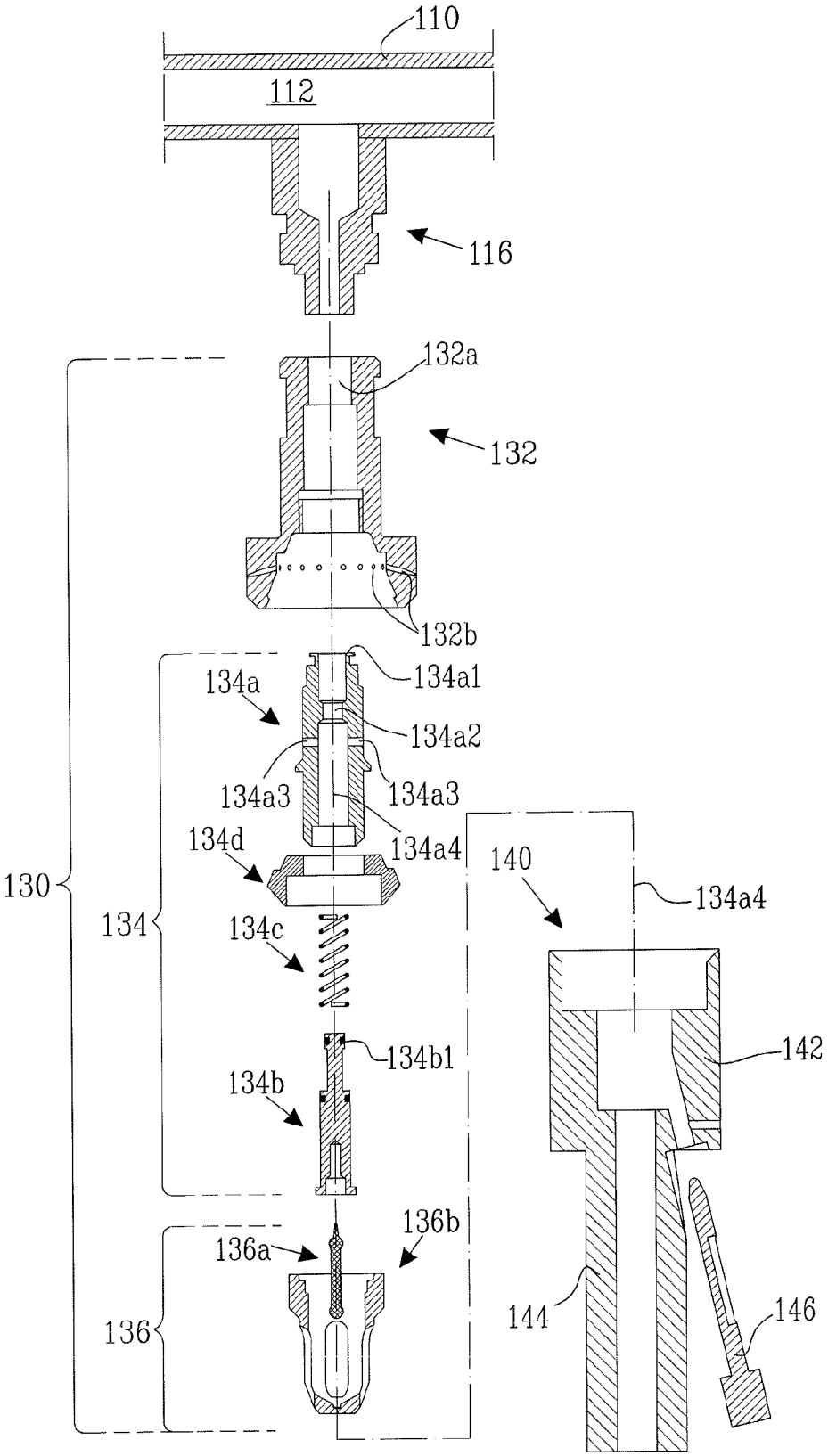
112
100

Fig. 1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132a
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132b
134a
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134a2
134a3
134a3
134a4
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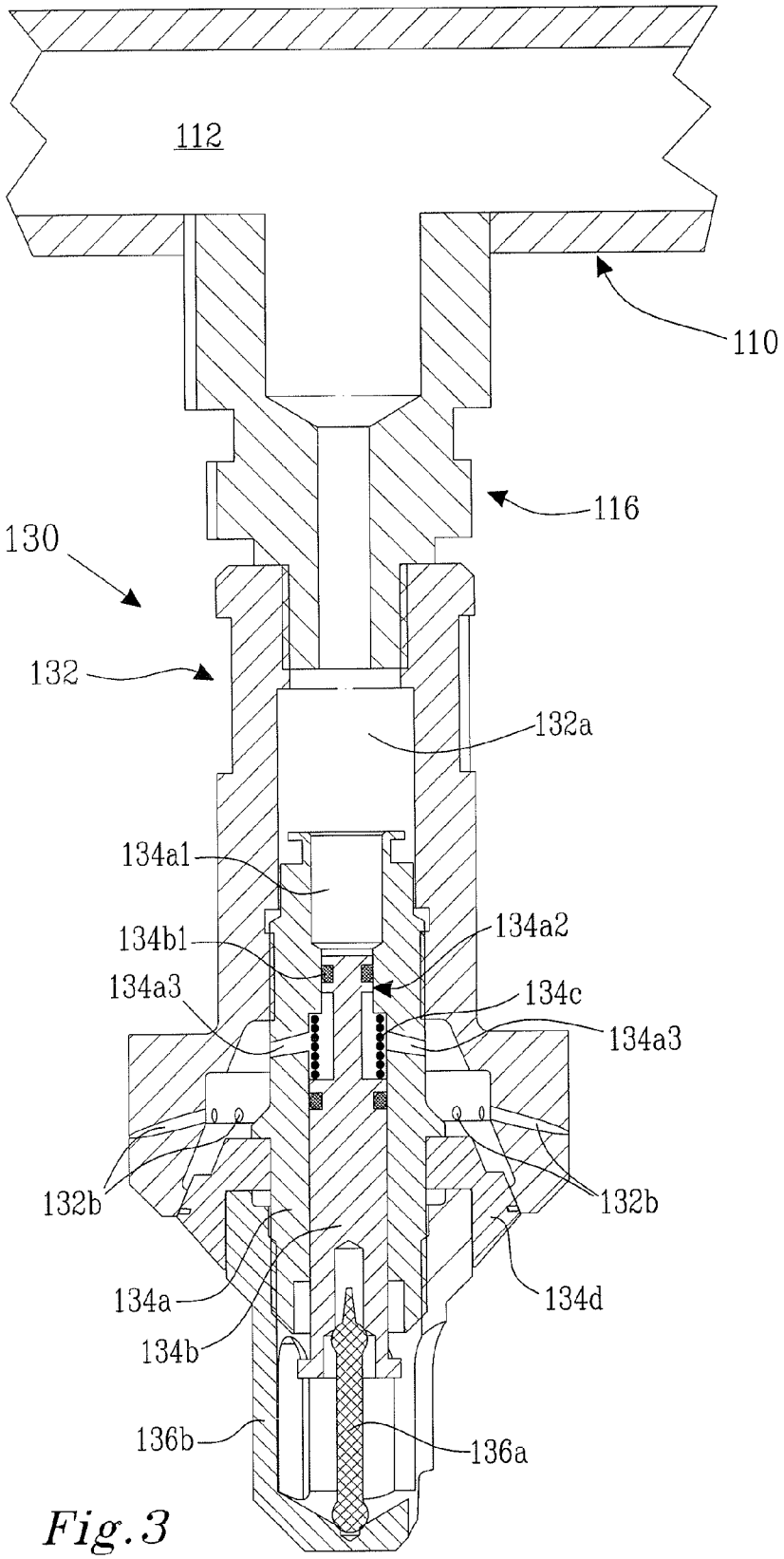
134c
134b
134b1
136b
136a
136
140
134a4
142
144
146

Fig. 2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132a
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134a3
132b
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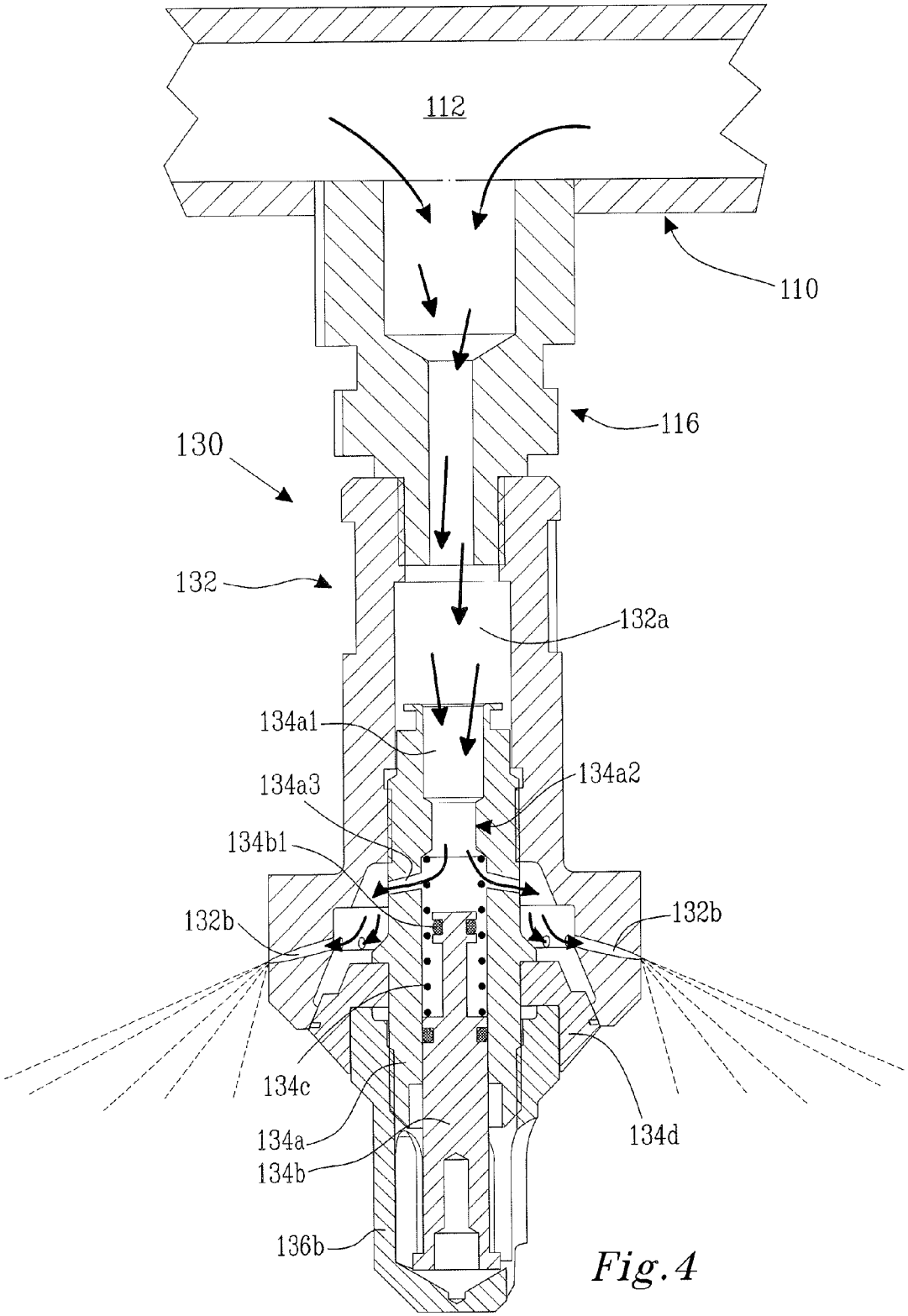
134d
134b
136b
136a

Fig. 3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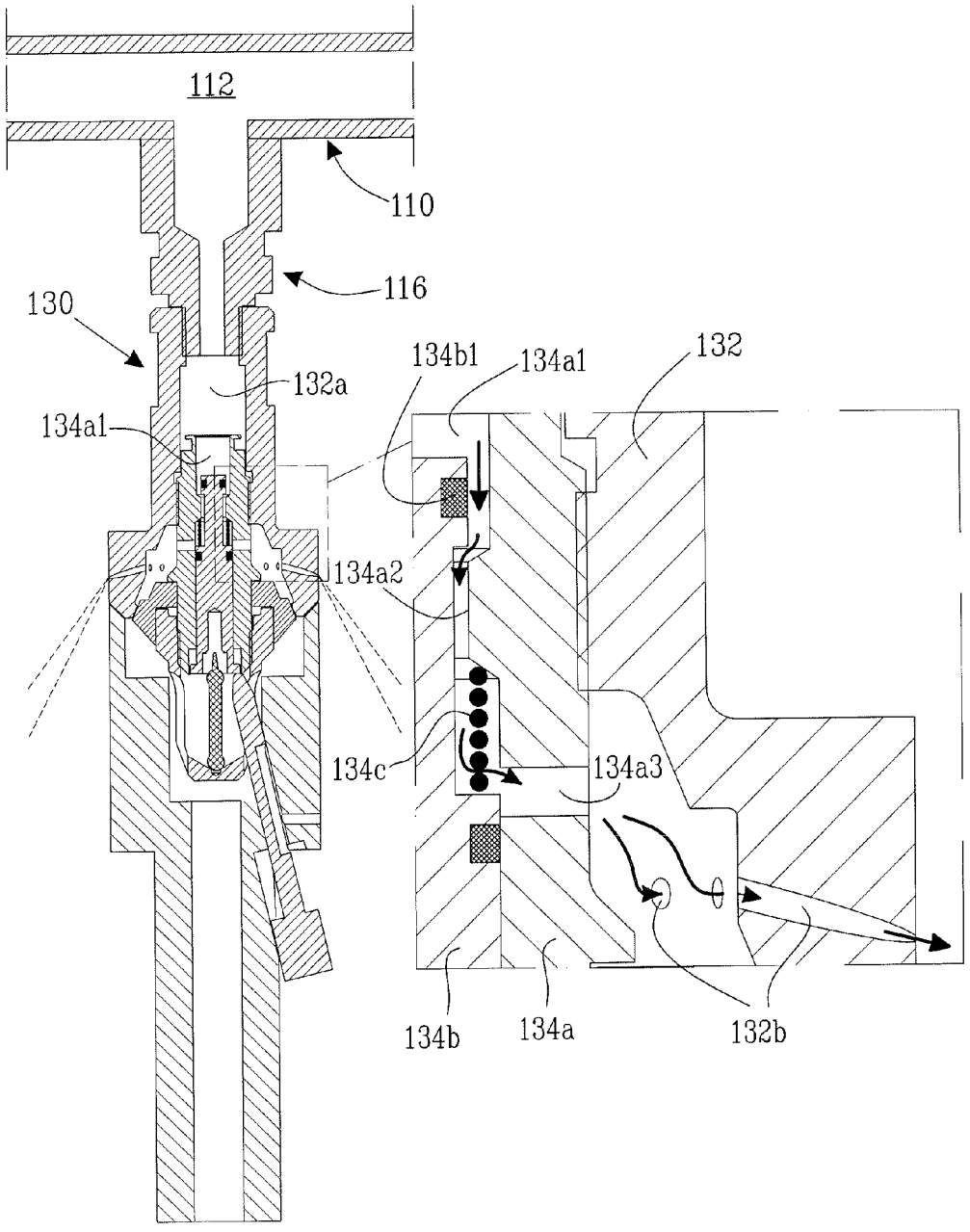
134d
136b

Fig. 4


112
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116
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132a
134a1
134b1
134a1
132
134a2
134c
134a3
134b
134a
132b

Fig.5

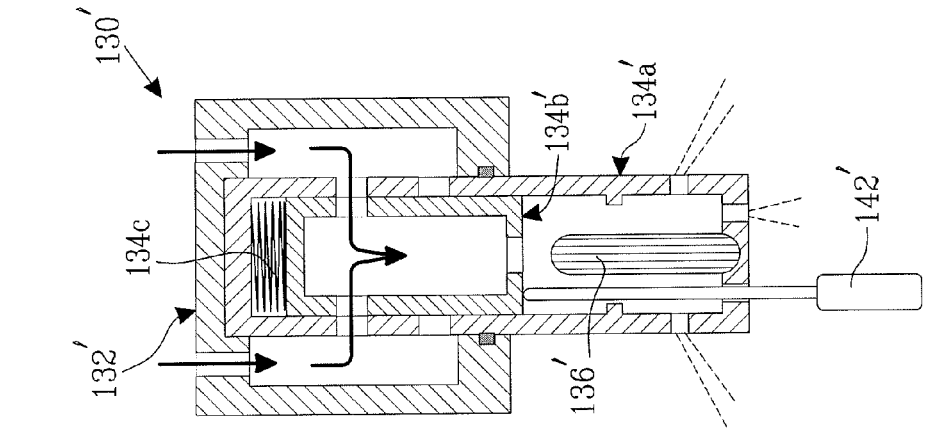

Fig. 6C

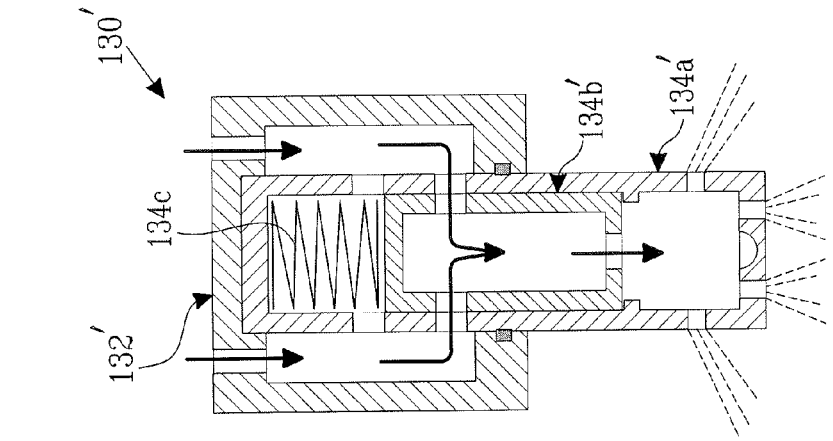

Fig. 6B

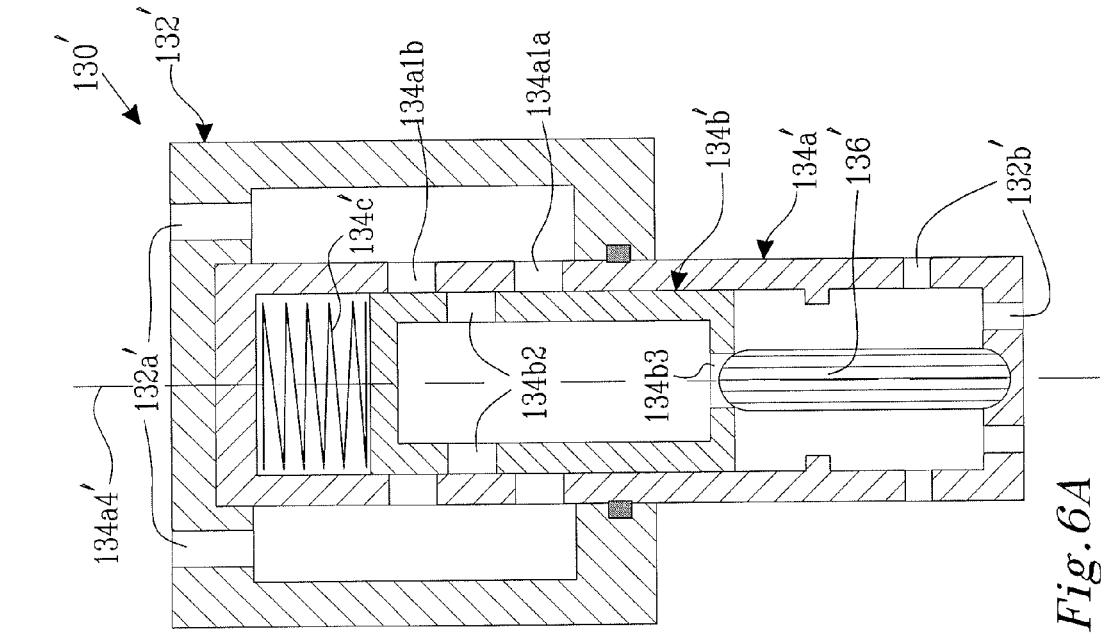

Fig. 6A

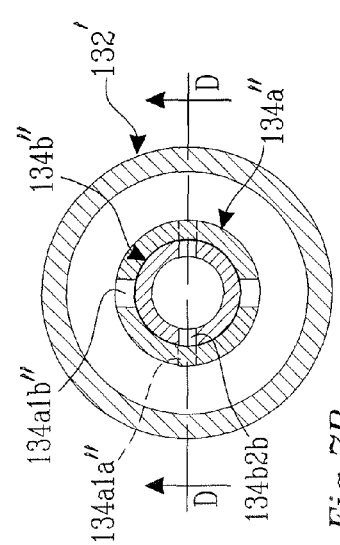

Fig. 7B

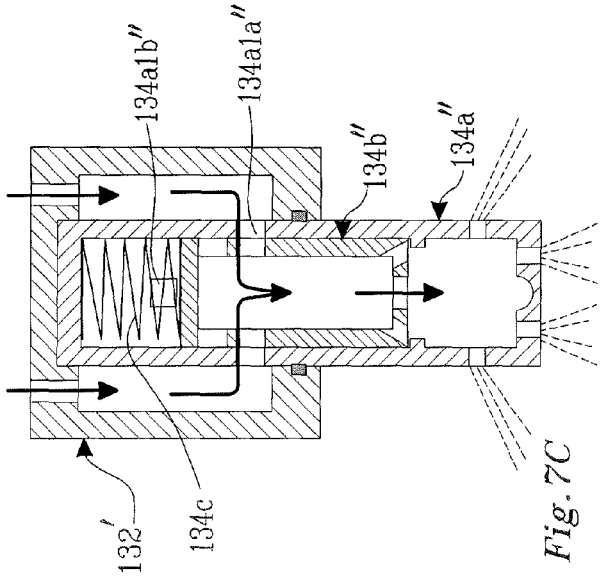

Fig. 7C

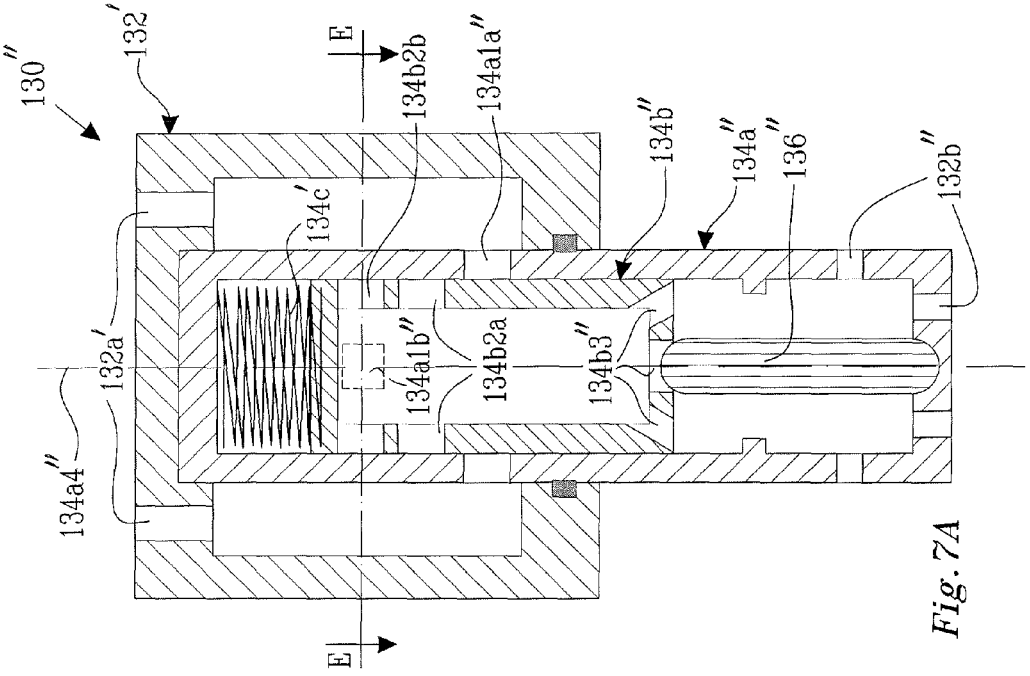

Fig. 7A

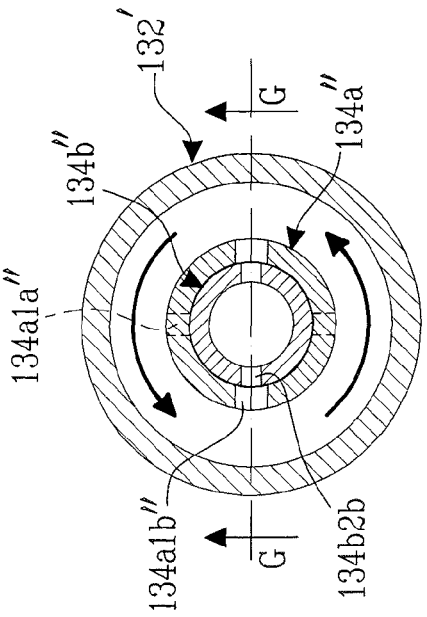
132'
G
134a''
134b''
134a1a''
134a1b''
G
134b2b

Fig. 7E

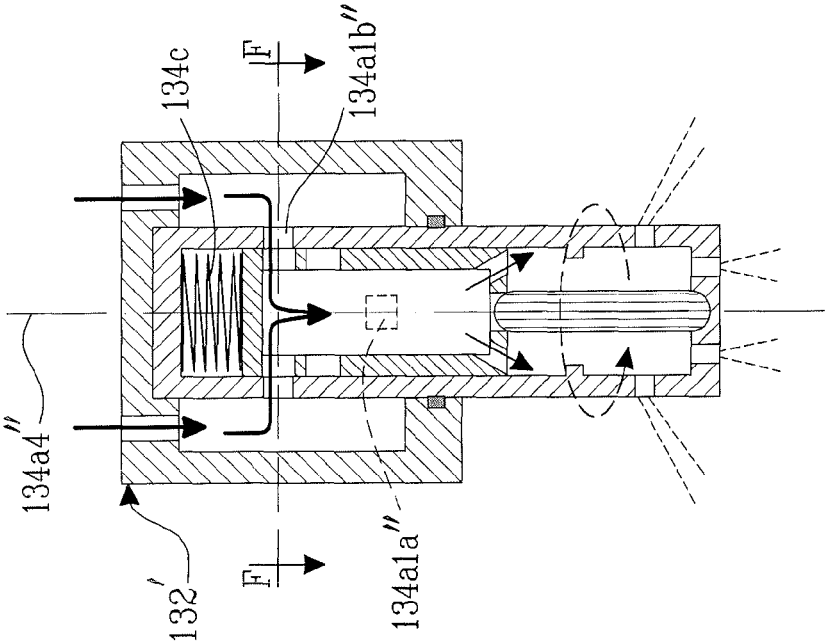
134c
F
134a1b''
134a4''
132'
F1
134a1a''

Fig. 7D

SPRINKLER AND METHOD FOR TESTING A SPRINKLER

TECHNICAL FIELD

The present invention relates to a sprinkler head and a method in a sprinkler head for testing and/or de-airing a sprinkler system.

BACKGROUND

Sprinkler systems have for many years been used to dampen and/or to extinguish fire in different spaces, e.g. in offices, industrial premises, hotels, apartments or shops etc. A sprinkler system in most cases comprises a piping network or the like extending through the space that the sprinkler system is to protect in case of fire. The piping network is in most cases connected to a pressurized water supply and it may be divided into several branches, each of which may extend through different parts of the space concerned. In the various branches, one or more sprinkler heads are mounted. Each sprinkler head has a heat-sensitive triggering device. The triggering device is arranged to activate the sprinkler head if a fire breaks out near the sprinkler head. When the sprinkler head is activated, the sprinkler head spreads water from the piping network out over the fire and prevents it from spreading and/or ensures that it is extinguished.

There are two main categories of sprinkler systems, wet sprinkler systems and dry sprinkler systems. In an operative wet sprinkler system, there is pressurized water in the piping network both when the sprinkler system is in a non-activated state and when the sprinkler system is in an activated state. In an operative dry sprinkler system, there is no water or very little water in the piping network when the sprinkler system is in a non-activated state. Instead the piping network is supplied with water when a fire has been detected. Dry sprinkler system may advantageously be used in spaces exposed to large temperature variations. This is particularly appropriate if the sprinkler system run the risk of being exposed to cold that would freeze any possible water in the piping system and be able to burst the pipes resulting in leakage. Wet sprinkler systems are in other words typically used in spaces not running the risk of being exposed to cold that could freeze the water in the piping network.

In a wet sprinkler system water flow detectors may be used to detect when one or more sprinkler heads have been activated and spread water. One or more water flow detectors may be arranged in one or more branches of the piping system for detecting activation of one or more sprinkler heads in a branch. The activation of a sprinkler head usually indicates that a fire has broken out in a protected space and the space concerned should then be evacuated and fire department called. It is thus important to as safely as possible be able to detect that a sprinkler head has been activated, as it normally means that a fire has broken out.

Water flow detectors of now described and kind and the like thus have an important function in many wet sprinkler system and the water flow detectors should therefore be tested continuously to ensure that they from time to time work as intended.

It is also important that the water flow detectors of now described and kind and the like are reliable, i.e. that no or very few false alarms occur. One reason for false alarm is that air has gathered in one or more branches of the piping system in a wet sprinkler system. Because air may be compressed, the water in the piping system may begin moving without any sprinkler head having been activated. This may e.g. happen in spaces which are moving, e.g. in spaces on boats equipped with sprinkler systems, where rough sea may make the water in the piping system of the sprinkler system move, if air is gathered in one or more branches of the piping system. A water flow detector may detect such movements of the water and incorrectly indicate that a sprinkler head has been activated. It is thus important that any possible air may be removed from different branches of the piping system of a wet sprinkler system.

On the whole, it is advantageous if the function of a sprinkler system in whole or in part may be tested in a simple and quick way in different branches of the piping system of the sprinkler system.

SUMMARY

Embodiments of the present invention provide a sprinkler head, the function of which may be tested during normal operation of the sprinkler system. The sprinkler head does for example not need to be dismounted to be tested and the sprinkler system does not need to be set in a special test mode, but may remain in normal operation. For example the pressure in the supply system normally neither needs to be lowered nor raised to allow for a test. The function of the sprinkler system may be tested in each position where a sprinkler head according to embodiments of the present invention is connected to the distribution system. In addition, the test is so simple that no special previous knowledge is required to perform the test.

Sprinkler systems that are provided with sprinkler heads in accordance with embodiments of the present invention may thus be tested easily and quickly. Such sprinkler systems may therefore be tested often without great expenses. Such sprinkler systems may also be tested without interference with the function of the sprinkler system, which may be maintained essentially unchanged during the testing procedure. Because the sprinkler system with sprinkler heads in accordance with embodiments of the present invention may be tested (even often), they may ensure a greater functional reliability compared to other sprinkler systems with sprinkler heads that may not be tested, or that may not be tested in a simple way.

Testing of a sprinkler head according to an embodiment of the present invention also means that any possible air may be removed from the branch of the piping system in which the sprinkler head is arranged. This reduces the risk that the water in the piping system begins to move without any sprinkler head has been activated, which reduces the risk that a possible water flow detector incorrectly will indicate that a sprinkler head has been activated.

At least one of the improvements and/or advantages mentioned above may be accomplished in accordance with a first embodiment of the present invention which is directed to a sprinkler head comprising an inlet device configured to operatively lead a fire-extinguishing medium and air from a distribution system into the sprinkler head, and a outlet device configured to operatively release fire-extinguishing medium and air from the sprinkler head, and a flow passage configured to lead fire-extinguishing medium and air from the inlet device to the outlet device, and a valve device configured to operatively be maintained in a first non-activated state by a triggering device in the sprinkler head, so that the flow passage is closed, and configured to in an active state operatively open the flow passage when the triggering device is activated in a heated state, so that air and fire-extinguishing medium may flow from the inlet device to the outlet device. The valve device is configured to in a second non-activated test state operatively open the flow passage, so that air and fire-extin-

guishing medium may flow from the inlet device through the flow passage and out through the outlet device.

At least one of the improvements and/or advantages mentioned above may be accomplished in accordance with a first embodiment of the present invention directed to a method for testing a sprinkler head. The sprinkler head comprises: a valve device which is held in a first non-activated state by a triggering device in the sprinkler head and closes a flow passage, which is configured to lead fire-extinguishing medium and air from a distribution system to an outlet device which is configured to operatively release air and fire-extinguishing medium from the sprinkler head, where the valve device further is configured to in an active state operatively open the flow passage when the triggering device has been activated in a heated condition, so that air and fire-extinguishing medium may flow from the distribution system to the outlet device. The method comprises the activity to: set the valve device in a second non-activated test state that opens the flow passage, so that air and fire-extinguishing medium may flow from the distribution system via the flow passage and out through the outlet device.

Further advantages of the invention and embodiments of this will be evident from the detailed description below.

It should be emphasized that the term "comprising/comprises" when used herein shall be interpreted in such a way that it specifies the presence of the indicated features, activities, steps, components or the like thereby without ruling out the presence or addition of one or more other features, activities, steps, components or the like.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic diagram of an exemplifying sprinkler system **100** comprising at least one sprinkler head **130** according to an embodiment of the present invention;

FIG. **2** is an exploded view of the sprinkler head **130** in a cross section viewed according to the section line A-A in FIG. **1**,

FIG. **3** is a composite sketch of the sprinkler head **130** in a non-activated state viewed according to the section line A-A in FIG. **1**,

FIG. **4** is a cross section of the sprinkler head **130** in an activated state viewed according to the section line B-B in FIG. **1**,

FIG. **5** is a cross section of the sprinkler head **130** in a non-activated test state viewed according to the section line C-C in FIG. **1**,

FIG. **6***a* is a schematic cross-section of a sprinkler head **130'** shown in a non-activated state according to an embodiment of the present invention;

FIG. **6***b* shows the sprinkler head **130'** in FIG. **6***a* in an activated state,

FIG. **6***c* shows the sprinkler head **130'** in FIG. **6***a* in a non-activated test state,

FIG. **7***a* is a schematic cross-section of the sprinkler head **130"** in a first non-activated state viewed according to the section line D-D in FIG. **7***b*.

FIG. **7***b* is a schematic cross-section of the sprinkler head **130"** in FIG. **7***a* viewed according to the section line E-E in FIG. **7***a*

FIG. **7***c* is a schematic cross-section of the sprinkler head **130"** in an activated state viewed according to the section line B-B in FIG. **7***b*.

FIG. **7***d* shows the sprinkler head **130"** in a second non-activated test state viewed according to the section line G-G in FIG. **7***e*.

FIG. **7***e* shows the sprinkler head in the second non-activated state viewed according to the section line E-E in FIG. **7***d*.

DETAILED DESCRIPTION OF EMBODIMENTS

FIG. **1** shows a schematic view of an exemplifying sprinkler system **100**. The sprinkler system **100** comprises a distribution system **110**, a supply system **120** and one or more sprinkler heads **130**. FIG. **2** is an exploded view of the sprinkler head **130** in a cross section viewed according to the section line A-A in FIG. **1**. FIG. **3** is a composite sketch of the sprinkler head **130** in a non-activated state viewed according to the section line A-A in FIG. **1**. FIG. **4** is a cross section of the sprinkler head **130** in an activated state viewed according to the section line B-B in FIG. **1**. FIG. **5** is a cross section of the sprinkler head **130** in a non-activated test state viewed according to the section line C-C in FIG. **1**.

The sprinkler head **130** is configured to operatively spread fire-extinguishing medium from a distribution system **110** to the closest surroundings of the sprinkler head **130**. The sprinkler head **130** comprises an inlet device **132** that is configured to operatively be connected to the distribution system **110**. The inlet device **132** is configured to lead the fire-extinguishing medium **112** from the distribution system **110** into the sprinkler head **130**. The sprinkler head **130** further comprises an outlet device **132***b* which is connected to the inlet device **132** via a flow passage. The outlet device **132***b* is configured to operatively spread the fire-extinguishing medium **112** to the surroundings with the fire-extinguishing or fire-dampening effect. The sprinkler head **130** further comprises a valve device **134** that is configured to operatively close and open the flow passage. The sprinkler head **130** also comprises a triggering device **136** that is configured to in a first non-activated state to keep the valve device **134** closed, so that the flow passage is closed and in an activated heated state open the valve device **134**, so that the fire-extinguishing medium **112** may flow from the inlet device **132** through the flow passage and out through the outlet device **132***b*. The valve device **134** of the sprinkler head **130** is particularly configured to in a second non-activated test state operatively open the flow passage, so that air **114** and/or fire-extinguishing medium **112** may flow from the inlet device **132** through the flow passage and out through the outlet device **132***b*. This has a de-airing effect for any possible air **114** in the distribution system **110** and/or releasing effect for the fire-extinguishing medium **112**.

That the sprinkler head **130** spreads fire-extinguishing medium **112** with fire-extinguishing or fire-dampening effect does not necessarily mean that any possible fire may be extinguished by the sprinkler head **130**. For example, the sprinkler heads that spread fire-extinguishing medium in the form of water may not easily extinguish burning oil. Fire-extinguishing medium in the form of water may even be totally inappropriate to extinguish some burning metals, such as potassium, sodium, magnesium or the like. Fire-extinguishing or fire-dampening effect rather means that the most common forms of fire that may occur in the spaces covered by the distribution system **110** may be extinguished or at least be dampened by the fire-extinguishing medium **112**.

A more detailed description of the sprinkler head **130** will be given later.

With the exception of the sprinkler head **130**, the sprinkler system **100** and the like sprinkler systems are well known to a person skilled in the art. The sprinkler system **100** as such therefore requires no detailed description. Below is anyway given an overview of parts of the sprinkler system **100** that are relevant for embodiments of the present invention.

The distribution system **110** is configured to distribute fire-extinguishing medium **112** to one or more spaces where fire-extinguishing effect is desired in case of fire or the like. The space in question may be premises of various kinds, e.g. hotel rooms, office rooms, corridors, warehouses, industrial premises, machine rooms, computer rooms or other similar spaces. The space may also comprise spaces which temporary or permanently are located outdoors or which in different contexts come in contact with outdoor climate, e.g. because a door or a gate being opened or even because the space lacks heating. Naturally, this may impose specific requirements on the fire-extinguishing medium **112**, which preferably should remain in liquid form and therefore should not freeze or in any other way solidify. The distribution system **110** may for example consist of a piping system or a channel system or the like which is made of a suitable material that has been given an appropriate design.

It is preferred that the distribution system **110** branches off from the supply system **120** and out into the space where the fire-extinguishing effect is desired. One or more sprinkler heads **130** may be connected to the distribution system **110** in an essentially arbitrary position, e.g. in every space whereto fire-extinguishing medium **112** is distributed by the distribution system **110** and where fire-extinguishing effect is desired, e.g. in each room where fire-extinguishing effect is desired.

The supply system **120** is configured to operatively pump and/or lead in fire-extinguishing medium **112** into the distribution system **110**. The supply system **120** may for example be connected to a suitable water supply, such as a municipal water supply or the like. It is preferred that the supply system **120** is configured to maintain an appropriate pressure on the fire-extinguishing medium **112** in the distribution system **110**. It is preferred that the supply system **120** is configured to operatively maintain an appropriate pressure on the fire-extinguishing medium **112** both when the sprinkler system **100** is in a non-activated normal state and in an activated fire-extinguishing state. To keep an appropriate pressure on the fire-extinguishing medium **112** the supply system **120** may for example comprise a pressure control device **122** that is configured to pump and/or lead fire-extinguishing medium **112** into the distribution system **110**. Pressure control device **122** may for example comprise a pumping device and/or a valve device or a similar device for pressurization of the fire-extinguishing medium **112**. Pressure control device **122** may also comprise a pressure sensor device for measuring the present pressure of the supply system **120**. Pressure control device **122** may be operatively controlled by a supply management system **124**, so that the fire-extinguishing medium **112** is kept under an appropriate pressure. The supply management system **124** may be configured to control said pump devices and/or valve devices in the pressure control device **122**, e.g. by means of the pressure sensor device.

The fire-extinguishing medium **112** is preferably a liquid medium that may flow from the supply system **120** through the distribution system **110** to the sprinkler head **130** and be spread out from there. The fire-extinguishing medium **112** may for example be water or the like, or water mixed with one or more other appropriate substances or liquids, or similar. The fire-extinguishing medium **112** could for example be mixed with a substance or liquid making the fire-extinguishing medium **112** not risking solidifying, e.g. not freezing at low temperatures.

FIGS. **2**, **3**, **4** and **5** show details of the exemplifying sprinkler head **130** according to an embodiment of the present invention. An exploded view of the sprinkler head **130** and the testing device **140** is shown in FIG. **2** viewed according to section line C-C in FIG. **1**. A composite drawing of the sprinkler head **130** is shown in the first non-activated state in FIG. **3** viewed according to section line A-A in FIG. **1**. A composite drawing of the sprinkler head **130** is shown in the activated state in FIG. **4** viewed according to section line B-B in FIG. **1**. A composite drawing of the sprinkler head **130** is shown in the second non-activated test state in FIG. **5** viewed according to section line C-C in FIG. **1**.

The sprinkler head **130** comprises an inlet device **132** configured to operatively lead a fire-extinguishing medium **112** and air **114** from the distribution system **110** into the sprinkler head **130**. The sprinkler head **130** also comprises an outlet device **132***b* configured to operatively release fire-extinguishing medium **112** and air **114** from the sprinkler head **130**. The sprinkler head **130** further comprises a flow passage configured to lead fire-extinguishing medium **112** and **114** from the inlet device **132** to the outlet device **132***b*. The sprinkler head **130** also comprises a valve device **134** configured to be operatively held in a first non-activated state of a triggering device **136** in the sprinkler head **130**, so that the flow passage is closed. Valve device **134** is further configured to in an active state operatively open the flow passage when the triggering device **136** is activated in a heated state, so that the air **114** and fire-extinguishing medium **112** may flow from the inlet device **132** to the outlet device **132***b*. The valve device **134** is also configured to in a second non-activated test state operatively open flow passage so that air **114** and fire-extinguishing medium **112** may flow from the inlet device **132** through the flow passage and out through the outlet device **132***b*.

The inlet device **132** is configured to operatively lead fire-extinguishing medium **112** into the sprinkler head **130** from the distribution system **110**. For this purpose, the inlet device **132** may for example be configured to operatively be connected to a connection device **116** of the distribution system **110**, such that an inlet **132***a* of the inlet device **132** may lead fire-extinguishing medium **112** from the distribution system **110** into the sprinkler head **130**. How the sprinkler head **130** is connected to the distribution system **110** is not important, provided that the fire-extinguishing medium **112** may flow into the sprinkler head **130** from the distribution system, the **110**. The connection may for example occur by means of a screw coupling, a bayonet coupling or by gluing, soldering or welding or in any other appropriate manner. The inlet device **132** shown in FIG. **2** comprises an outlet device **132***b* configured to operatively spread fire-extinguishing medium **112** from the sprinkler head **130** to the surroundings with fire-extinguishing effect. Outlet device **132***b* is connected to the inlet device **132** via a flow passage (indicated by large arrows in FIG. **4** and FIG. **5**, described detailedly below) so that the fire-extinguishing medium **112** may flow from the inlet **132***a* to the outlet device **132***b*. Embodiments of the sprinkler head **130** may have a plurality of flow passages connecting the inlet device to one or more outlet devices. Embodiments of the sprinkler head **130** may have the outlet device **132***b* arranged in any other place than at the inlet device **132**. For example, an outlet device with the same or similar function as the outlet device **132***b* may be arranged on the valve device **134** and/or the triggering device **136**. In the embodiment of the sprinkler head **130** shown in FIG. **2**, the outlet device **132***b* has a number of holes. The holes are preferably arranged in a circle around the inlet device **132** so that the holes essentially extend radially from the center of the inlet device **132** to the periphery of the inlet device **132**. Other types of outlet devices with one or more holes or the like are clearly conceivable.

The valve device **134** is configured to operatively close and open the aforementioned flow passage (indicated by large arrows in FIG. **4** and FIG. **5**, described detailedly below). In

the first non-activated state, the valve device **134** is configured to operatively close the flow passage, see FIG. **3**. In the activated state, the valve device **134** is configured to operatively open the flow passage so that fire-extinguishing medium **112** may flow from the inlet device **132** via the flow passage and out through the outlet device **132***b* with a fire-extinguishing or fire-dampening effect, see FIG. **4**. In the second non-activated test state valve device **134** is configured to operatively open the flow passage so that air **114** and/or fire-extinguishing medium **112** may flow from the inlet device **132** via the flow passage and out through the outlet device with a de-airing effect, see FIG. **5**. From e.g. FIG. **2** it may be concluded that the valve device **134** comprises a valve body **134***a* and a flow control device **134***b* (e.g. a piston device). The valve device **134** may also comprise a biasing means **134***c* (e.g. a spring) and a fastening device **134***d*.

The valve body **134***a* in FIG. **2** is configured to be operatively connected to the inlet device **132** of the sprinkler head **130** so that a valve body inlet **134***a***1** of the valve body **134***a* may lead fire-extinguishing medium **112** from the distribution system **110** via the inlet device **132** into the valve body **134***a*. How the valve body **134***a* is connected to the inlet device **132** of the sprinkler head **130** is not important, provided that fire-extinguishing medium **112** may flow from the distribution system **110** into the valve body **134***a*. The connection may for example occur by means of a fastening device **134***d*. The fastening device **134***d* may, for example be configured to be screwed into the inlet device **132** so that the valve body is tensioned and fixed to the inlet device **132**. Alternatively, the valve body **134***a* may be connected to the inlet device **132** of the sprinkler head **130** using a bayonet coupling or by gluing, soldering or welding or in any other appropriate way. The exemplifying valve body **134***a* has a tubular interior with a tubular and tapered flow control waist **134***a***2** which extends along a portion of the tubular interior of the valve body **134**. The flow control waist **134***a***2** is configured to operatively cooperate with the flow control device **134***b* so that the aforementioned flow passage may be closed and opened. The valve body **134***a* also comprises a valve body outlet **134***a***3**. The valve body outlet **134***a***3** is connected to the valve body inlet **134***a***1** via the tubular interior of the valve body and flow control waist **134***a***2** so that the fire-extinguishing medium **112** may flow from the valve body inlet **134***a***1** to valve body outlet **134***a***3** and further to the first outlet device **132***b* of the inlet device **132**.

From the above description the observant reader realizes that said flow passage (indicated by large arrows in FIG. **4** and FIG. **5**) is formed by the inlet **132***a* and the outlet device **132***b* of the inlet device **132**, and the valve body inlet **134***a***1**, the flow control waist **134***a***2** and valve body outlet **123***a***3** of the valve device **134**. Through the flow passage, fire-extinguishing medium **112** may flow from the inlet **132***a* to the outlet device **132***b* of the inlet device **132**, via valve body inlet **134***a***1**, flow control waist **134***a***2** and the valve body outlet **123***a***3** of the valve device **134**. From the outlet device **132***b* the fire-extinguishing medium **112** may be spread from the sprinkler head **130** to the surroundings with fire dampening or fire-extinguishing effect (see FIG. **4**). From the outlet device **132***b* may alternatively fire-extinguishing medium **112** and/or air **114** be spread from the sprinkler head **130** to the surroundings with testing and/or de-airing effect (see FIG. **5**).

As mentioned earlier, the flow control device **134***b* is configured to operatively cooperate with the valve body **134** so that the flow passage may be closed and opened. To accomplish this, the flow control device **134***b* may e.g. be provided with a flow seal **134***b***1** which is configured to operatively seal against the valve body **134**, e.g. against the flow control waist **134***a***2** as e.g. shown in FIG. **4**. The flow seal **134***b***1** may e.g. be a mechanical seal device, e.g. an o-ring or the like. It is preferred that the flow control device **134***b* is arranged to operatively move from a first position closing the flow passage in the first non-activated state (see FIG. **3**) to a second position opening the first flow passage in the activated state (see FIG. **4**), and to operatively move from the first position to a third test position which opens the flow passage in the second non-activated test state (see FIG. **5**). It is preferred that the flow control device **134***b* is arranged inside the valve body **134***a*, e.g. in the tubular interior of the valve body **134***a*. Naturally, the flow control device may be arranged in another way, e.g. outside of a valve body or the like, e.g. enclosing a valve body or the like. The flow control device **134***b* shown in FIG. **2** is a piston-like device that is configured to operatively move along an axis of the valve body **134***a*, e.g. the center axis **134***a***4** of the valve body **134***a*. The center axis **134***a***4** of the valve body **134***a* and the center axis of the sprinkler head **130** may be the same.

It is preferred that the flow control device **134***b* is biased against the triggering device **136** and/or triggering unit **136***a* of the trigging device **136**. It is preferred that the flow control device **134***b* by means of the biasing may be pressed from the first position which closes the flow passage of the first non-activated state (see FIG. **3**) to the second position which opens the first flow passage in the activated state (see FIG. **4**), and so that the flow control device **134***b* may be pressed against the biasing from the first position to the third position which opens the flow passage in the second non-activated state (see FIG. **5**). In order to create the biasing of the flow control device **134***b*, a biasing device **134***c* may be used. The biasing device **134***c* may e.g. be a spring device or similar device, such as a coil spring or the like. The biasing device **134***c* may e.g. be arranged inside the valve body **134***a* between the valve body **134***a* and the flow control device **134***b*, e.g. as shown in FIGS. **3**, **4** and **5**.

Attention is now directed against the triggering device **136** of the exemplifying sprinkler head **130**. The triggering device **136** is configured to operatively hold the valve device **134** closed in the first non-activated state and to open the valve in the activated state. The triggering device **136** may comprise a triggering unit **136***a*. The triggering device **136** may also comprise a triggering bracket **136***b* arranged to hold triggering unit **136***a* in place.

The triggering unit **136***a* is configured to operatively hold the valve device **134** closed in the first non-activated state and to open the valve device **134** in the activated state. The embodiment of the triggering unit **136***a* which is shown in FIG. **2** may consist of a container that is made of an essentially rigid material. The container contains a substance that expands when the substance is heated so that the container cracks and collapses (is activated). The triggering device **136***a* may, for example be a frangible glass container with a liquid that is expanding rapidly, when the liquid is exposed to increasing temperature, so that the glass container explodes, preferably at a predetermined temperature. When a triggering device **136***a* in the form of the now-mentioned container is exploded and collapses, the container completely or partly disappears. The flow control device **134***b*, which is held by the triggering device **136***a*, then is pressed by the above-mentioned biasing from the first position, which closes the flow passage in the first non-activated state (see FIG. **3**), to the second position, which opens the first flow passage in the now activated state (see FIG. **4**).

The triggering bracket **136***b* is arranged to hold the triggering device **136***a* in place such that the triggering unit **136***a* may hold the valve device **134** closed in the first non-activated

state. As previously described with reference to for example FIG. **2** and FIG. **3**, the triggering unit **136***a* abuts in the first non-activated state against the triggering bracket **136***b* so that the triggering unit **136***a* is held against the flow control device **134***b*, which in turn is biased against the triggering unit **136***a*. From FIG. **3** it may be concluded that the flow control device **134***b* then closes the flow passage (indicated by large arrows in FIG. **4** and FIG. **5**). This may occur by means of flow seal **134***b***1** sealing against flow control waist **134***a***2** of the valve body **134***b*. Other flow control devices of other embodiments may seal the flow passage in another way. As may be concluded from for example FIG. **3** and FIG. **4**, the triggering bracket **136***a* is a part of the sprinkler head **130**. The triggering unit **136***a* may for example be connected against the valve body **134***a* or against the inlet device **132** or against any other part of the sprinkler head **130**. The connection may for example occur by means of a screw connection, a bayonet coupling or by gluing, soldering or welding or in any other appropriate manner.

A testing device **140** may be used to influence the valve device **134**, being in the second non-activated state, to open the flow passage so that air **114** and/or fire-extinguishing medium **112** may flow from the inlet device **132** through the flow passage and out through the outlet device **132***b*. It is preferred that the testing device **140** has a fixation unit **142** that is designed to fix the testing device in relation to the sprinkler head **130**. The fixation unit **142** may, for example consist of a bowl-shaped portion or other recess that is configured to at least partially enclose the sprinkler head **130** so that the testing device may be fixed in relation to the sprinkler head **130**. It is further preferred that the bowl-shaped portion **142** is arranged on a rod **144**. The rod **144** may, for example be longer than one meter, or longer than 1.5 meters, or longer than 2 meters. It is the preferred that the rod is not longer than 5 meters. The rod **144** may have a telescoping function with the effect that the rod **144** may be pushed out and/or pulled together. It is preferred that the bowl-shaped portion **142** comprises a short rod-like activation part **146** or the like that is configured to be operatively applied against the sprinkler head **130** and press the flow control device **134***b* to the third position in the second non-activated state (see FIG. **5**). An advantage of using a testing device **140** with a bowl-shaped portion **142** arranged on a long rod **144** is that the operator pressing flow control device **134***b* to the third position may be at a distance away from the sprinkler head **130**, which may be appropriate in those cases the sprinkler head **130** is located high up in a ceiling and the operator may stand on the floor and still fix the testing device **140** and the bowl-shaped portion **142** with the activation part **146** against the sprinkler head **130** so that the flow control device **134***b* may easily be pushed to the third position.

Above, the sprinkler head **130** has been described with reference to FIGS. **1-5**. As already mentioned, the sprinkler head **130** is only one embodiment of the present invention.

Below a sprinkler head **130'** is described with reference to FIGS. **6***a*, **6***b*, **6***c*. The sprinkler head **130'** is another embodiment of the present invention. FIG. **6***a* is a schematic cross-section of the sprinkler head **130'** shown in a first non-activated state. FIG. **6***b* shows the sprinkler head **130'** of FIG. **6***a* in an activated state, and FIG. **6***c* shows the sprinkler head **130'** in FIG. **6***a* in a second non-activated test state.

The sprinkler head **130'** comprises an inlet device **132'** that is configured to be operatively connected to the distribution system **110** such that an inlet **132***a'* of the inlet device **132'** may lead a fire-extinguishing medium **112** from the distribution system **110** into the sprinkler head **130'** in the same or similar manner as described above for the inlet device **132**.

The sprinkler head **130'** further comprises a valve device having a valve body **134***a'*, a flow control device **134***b'* and a triggering device **136'**. The valve device may also comprise a biasing device **134***c'* (e.g. a spring).

The valve body **134***a'* is configured to be operatively connected to the inlet device **132'** of the sprinkler head **130'** so that a valve body inlet consisting of a first valve body inlet **134***a***1***a* and a second valve body inlet **134***a***1***b* of the valve body **134***a'* may lead fire-extinguishing medium **112** from the distribution system **110** via the inlet device **132'** into the valve body **134***a'* on the same or similar manner as described above for the valve body inlet **134***a***1** of the valve body **134***a*. The valve body **134***a'* also comprises an outlet device **132***b'* that is configured to operatively spread the fire-extinguishing medium **112** to the surroundings with fire-extinguishing or fire-dampening effect in the same or similar manner as described above for the outlet device **132***b*. The first valve body inlet **134***a***1***a* is a part of a first flow passage that allows the fire-extinguishing medium **112** to flow from the inlet **132***a'* of the inlet device **132'**, via the first valve body inlet **134***a***1***a* and out through the outlet device **132***b'*. The second valve body inlet **134***a***1***b* is part of a second flow passage that allows the fire-extinguishing medium **112** and/or air **114** to flow from the inlet **132***a'* of the inlet device **132'**, via the second valve body inlet **134***a***1***b* and out through the outlet device **132***b'*. The first flow passage and the second flow passage are described more detailedly below.

The flow control device **134***b'* is configured to operatively cooperate with the valve body **134'** so that the first flow passage and the second flow passage may be closed and opened. For this purpose, the flow control device **134***b'* comprises a flow inlet **134***b***2** and a flow outlet **134***b***3**. FIG. **6***a* shows how the flow control device **134***b'* holds the first flow passage and the second flow passage closed in the first non-activated state in the same or similar manner as previously described for flow control device **134***b*. FIG. **6***b* shows how the flow control device **134***b'* opens the first flow passage (see the large arrows in FIG. **6***b*) in the activated state in the same or similar manner as previously described for the flow control device **134***b*. FIG. **6***c* shows how the flow control device **134***b'* opens the second flow passage (see the large arrows in FIG. **6***c*) in the second non-activated state in a similar manner to that previously described for flow control device **134***b*. It is preferred that the flow control device **134***b'* is biased by using a biasing device **134***c'* so that the flow control device **134***b'* by means of the biasing may be pressed from a first position which closes the first flow passage in the first non-activated state (see FIG. **6***a*) to a second position which opens the first flow passage in the activated state (see FIG. **6***b*), and so that the flow control device **134***b'* may be pressed against the biasing from the first position to a third position which opens the second flow passage in the second non-activated state (see FIG. **6***c*). The biasing device **134***c'* may be of the same or similar kind as the previously described biasing device **134***c*. The flow inlet **134***b***2** of the flow control device **134***b'* and the flow outlet **134***b***3** form a part of the first flow passage and the second flow passage that allow the fire-extinguishing medium **112** and/or air to flow from the inlet **132***a'* of the inlet device **132'**, via valve body inlet **134***a***1***a* or **134***a***1***b* and via the flow inlet **134***b***2** of the flow control device **134***b'* and the flow outlet **134***b***3** and out through the outlet device **132***b'*.

The triggering device **136'** is configured to operatively hold the valve device of the sprinkler head **130'** closed in the first non-activated state and to open the valve in the activated state in the same or similar manner as previously described for triggering device **136**. It is preferred that the triggering device **136'** is of the same or similar kind as the triggering device

136*a*. It is further preferred that the flow control device **134***b*' which is held by the triggering device **136**' is pressed by means of the biasing device **134***c*' from the first position which closes the first flow passage in the first non-activated state (see FIG. **6***a*) to the second position which opens the first flow passage in the activated state (see the large arrows in FIG. **6***b*).

As already mentioned, the flow control device **134***b*' of the valve device may in the first position close the first flow passage of the valve device in the first non-activated state (see FIG. **6***a*) and in the second position open the first flow passage of the valve device in the activated state (see the large arrows in FIG. **6***b*) so that the fire-extinguishing medium **112** may flow from the inlet device **132**' through the first flow passage and out through the outlet device **132***b*', and in a third position open the second flow passage of the valve device in the second non-activated state (see large arrows in FIG. **6***c*) so that air **114** and/or fire-extinguishing medium **112** may flow from the inlet device **132**' through the second flow passage and out through the outlet device **132**'.

A testing device **142**' may be used to influence the valve device to in the second non-activated state open the first flow passage so that air **114** and fire-extinguishing medium **112** may flow from the inlet device **132**' through the first flow passage and out through the outlet device **132***b*'. The testing device **142**' may, for example be a short rod-shaped part or the like that is configured to be operatively applied to the sprinkler head **130**' and press the flow control device **134***b*' to the third position in the second non-activated state (see FIG. **6***c*). A disadvantage of using a short rod-like part is that the person pressing the flow control device **134***b*' to the third position must be close to the sprinkler head, which may be difficult in those cases where the sprinkler head **130**' is located high up in a ceiling.

Below a sprinkler head **130**" is described with reference to FIGS. **7***a*, **7***b*, **7***c*, **7***d*, **7***e*. The sprinkler head **130**" is an embodiment of the present invention. FIG. **7***a* is a schematic cross-section of the sprinkler head **130**" in a first non-activated state viewed according to the section line D-D in FIG. **7***b*. FIG. **7***b* is a schematic cross-section of the sprinkler head **130**" in FIG. **7***a* viewed according to the section line E-E in FIG. **7***a*. FIG. **7***c* is a schematic cross-section of the sprinkler head **130**" in an activated state viewed according to the section line B-B in FIG. **7***b*. FIG. **7***d* shows the sprinkler head **130**" in a second non-activated test state viewed according to the section line G-G in FIG. **7***e*. FIG. **7***e* shows the sprinkler head **130**" in the second non-activated state viewed according to the section line E-E in FIG. **7***d*.

The sprinkler head **130**" comprises the same or similar device inlet device **132**' as sprinkler head **130**. The inlet device **132**' is configured to be operatively connected to the distribution system **110** such that an inlet **132***a*' of the inlet device **132**' may lead a fire-extinguishing medium **112** from the distribution system **110** into the sprinkler head **130**" in the same or similar manner as described above for the inlet device **132**.

The sprinkler head **130**" further comprises a valve device with a valve body **134***a*", a flow control device **134***b*" and a triggering device **136**". The valve device may also comprise a biasing device **134***c*" (e.g. a spring).

The valve body **134***a*" is configured to be operatively connected to the inlet device **132**' of the sprinkler head **130**" so that a valve body inlet consisting of a first valve body inlet **134***a***1***a*" and a second valve body inlet **134***a***1***b*" of the valve body **134***a*" may lead a fire-extinguishing medium **112** from the distribution system **110** via inlet device **132**' into the valve body **134***a*" in the same or similar manner as described above for valve body inlet **134***a***1** of the valve body **134***a*. The valve body **134***a*" also comprises an outlet device **132***b*' that is configured to operatively spread the fire-extinguishing medium **112** to the surroundings with fire-extinguishing or fire-dampening effect in the same or similar manner as described above for the outlet device **132***b*. The first valve body inlet **134***a***1***a*" is part of a first flow passage that allows the fire-extinguishing medium **112** to flow from the inlet **132***a*' of the inlet device **132**', through valve house inlet **134***a***1***a*" and out through the outlet device **132***b*". The second valve body inlet **134***a***1***b* is part of a second flow passage that makes it possible for the fire-extinguishing medium **112** to flow from the inlet **132***a*' of the inlet device **132**', via the second valve body inlet **134***a***1***b*" and out through the outlet device **132***b*'. The first flow passage and the second flow passage are described more detailedly below.

The flow control device **134***b*" is configured to operatively cooperate with the valve body **134**" so that the first flow passage and the second flow passage may be closed and opened. For this purpose, the flow control device **134***b*" comprises a first flow inlet **134***b***2***a*, a second flow inlet **134***b***2***b* and a flow outlet **134***b***3**". FIGS. **7***a* and **7***b* show how the flow control device **134***b*" holds the first flow passage and the second flow passage closed in a first non-activated state in the same or similar manner as previously described for flow control device **134***b*. FIG. **7***c* shows how the flow control device **134***b*" opens the first flow passage in an activated state in the same or similar manner as previously described for flow control device **134***b*'. FIG. **7***d* shows how the flow control device **134***b*" opens the second flow passage in a second non-activated state similar to previously described for flow control device **134***b*. It is preferred that the flow control device **134***b*" is held biased by means of a biasing device **134***c*" so that the flow control device **134***b*" by means of the biasing may be pressed from a first position which closes the first flow passage in the first non-activated state (see FIG. **7***a*-**7***b*) to a second position which opens the first flow passage in the activated state (see FIG. **7***c*). The biasing device **134***c*" may for example be a spring device or similar.

The first flow inlet **134***b***2** of the flow control device **134***b*" and the flow outlet **134***b***3**" form a part of the first flow passage which makes it possible for the fire-extinguishing medium **112** to flow from the inlet **132***a*' of the inlet device **132**', via valve body inlet **134***a***1***a*" and via the first flow inlet **134***b***2***a* of the flow control device **134***b*" and the flow outlet **134***b***3**" and out through the outlet device **132***b*". The first flow passage is indicated with large arrows in FIG. **7***c*.

The second flow inlet **134***b***2***b* of the flow control device **134***b*" and the flow outlet **134***b***3** form a part of the second flow passage that allows the fire-extinguishing medium **112** to flow from the inlet **132***a*' of the inlet device **132**', via the second valve body inlet **134***a***1***b*" and via the second flow inlet **134***b***2***b* of the flow control device **134***b*" and the flow outlet **134***b***3**" and out through the outlet device **132***b*". The second flow passage is indicated with large arrows in FIG. **7***d*. The second flow passage is opened and closed by means of the valve body **134***b*" of the valve device being arranged to operatively be rotated from a first position to a second test position and back again, i.e. the valve body **134***b*" of the valve device may be rotated from the first position to the third position which opens the second flow passage in the second non-activated state (see FIG. **7***d*-**7***e*). The rotation is indicated by curved arrows in FIGS. **7***d* and **7***e*.

In the embodiment of the sprinkler head **130**" shown in FIG. **6***a*-**6***c* the valve body **134***b*" thus forms a second flow

control device which may be rotated from a first position to a third position which opens the second flow passage in the second non-activated state.

The triggering device **136"** is configured to operatively hold the valve device in the sprinkler head **130"** closed in the first non-activated state and to open the valve device in the activated state in the same or similar manner as previously described for the triggering device **136**. It is preferred that the triggering device **136"** is of the same or similar kind as the triggering unit **136***a*. It is further preferred that the flow control device **134***b***"** being held by the triggering device **136"** is pressed by means of the biasing device **134***c***'** from the first position which closes the first flow passage in the first non-activated state (see FIG. **7***a*) to the second position which opens the first flow passage in the activated state (see FIG. **7***c*).

As already mentioned above, the flow control device **134***b***"** of the valve device may in a first position close the first flow passage of the valve device in the first non-activated state (see FIG. **7***a*) and in a second position open the first flow passage of the valve device in the activated state (see FIG. **7***c*) so that fire-extinguishing medium **112** may flow from the inlet device **132'** through the first flow passage and out through the outlet device **132***b***"**. As also mentioned above, the valve body **134***b***"** of the valve device may in a third position open the second flow passage in the second non-activated state (see FIG. **7***d*) so that air **114** and fire-extinguishing medium **112** may flow from the inlet device **132'** through the second flow passage and out through outlet device **132***b"*.

When the flow control device of the valve device or the like is in a first, second or third position, or when the valve body of the valve device or the like is in a first or third position described above it means that the valve device as such assumes a first, second or third position which opens and/or closes one or more flow passages, e.g. as described above.

The valve devices described above are only exemplifying embodiments of valve devices which may be arranged in a first non-activated state to close one or more flow passages and in a second activated state to open one or more flow passages so that the fire-extinguishing medium **112** may flow through the flow passage or flow passages, and in a second non-activated state to open one or more flow passages so that air **114** and/or fire-extinguishing medium **112** may flow through the flow passage or flow passages. In other words, other embodiments of the present invention may comprise other types of valve devices and/or other types of flow control devices. For example, it could be a matter of a gate valve or the like, or a seat valve or the like, where the flow control device may consist of an appropriate body (e.g. a round, rectangular or conical body) which may be lowered and raised in a valve body so that the valve is opened or closed. Alternatively, the valve device may comprise a ball valve or the like where the flow control device may be a hollow ball that rotates in a spherical seat between an open position and a closed position, or a butterfly valve or the like where flow control device may be a disc or the like which is positioned in the flow of the fire-extinguishing medium **112** and which may be rotated between an open position where the disc is set parallel to the direction of flow and a closed position where the disk is set perpendicular to the direction of flow. A valve device according to embodiments of the present invention may contain one or more valve devices. Each valve device according to embodiments of the present invention may contain one or more flow control devices. A skilled person who reads and uses this description realizes that a plurality of different valve systems may be considered.

The triggering devices as described above are only exemplifying embodiments of appropriate triggering devices which are configured to operatively hold a valve device closed in a first non-activated state and to open the valve device in an activated state. Other types of triggering devices are fully possible, which are configured to operatively hold a suitable valve device closed in a first non-activated state and to open this valve device in an activated state. It may for example be a triggering device that is based on an electric motor, piezoelectric motor, pneumatic motor or hydraulic motor or the like, or a triggering device in the form of an electro-active polymer or the like, or in the form of a so-called MicroElectroMechanical Systems (MEMS) or even in the form of a so-called NanoElectroMechanical Systems (NEMS). Some embodiments of the triggering device may be controlled by means of one or more temperature sensing sensors that measure the temperature near the sprinkler head and/or by means of microprocessors or the like, which for example are implemented by means of integrated circuits or similar.

The exemplifying embodiments described above could be summarized as follows:

The embodiments relate to a sprinkler head which comprises an inlet device configured to operationally lead a fire-extinguishing medium **112** and air **114** from a distribution system **110** into the sprinkler head, and an outlet device configured to operatively release fire-extinguishing medium **112** and air **114** from the sprinkler head, and a flow passage configured to lead fire-extinguishing medium **112** and air **114** from the inlet device to the outlet device, and a valve device configured to operatively be held in a first non-activated state by a triggering device in the sprinkler head so that the flow passage is closed, and configured to in an activated state operatively open the flow passage when the triggering device is activated in a heated state so that air **114** and fire-extinguishing medium **112** may flow from the inlet device to the outlet device. The valve device is configured to in a second non-activated test state operatively open the flow passage so that air **114** and fire-extinguishing medium **112** may flow from the inlet device through the flow passage and out through the outlet device.

The valve device may comprise at least one flow control device arranged to operatively be moved from a first position closing the flow passage in the first non-activated state to a second position opening the flow passage in the activated state when the triggering device has been activated.

It is preferred that the flow control unit is arranged within the valve body, e.g. in the valve body's **134***a*. This is however not necessary, and embodiments of the present invention may have the flow control unit arranged in another way, e.g. outside of a valve body or the like, e.g. enclosing a valve body or the like.

The flow control device may be arranged to be operatively displaced from the first position to the second position along a first axis of the sprinkler head.

The flow control device may be arranged to be operatively displaced along the first axis from the first position to the third position which opens the flow passage in the second non-activated test state.

The valve device may comprise at least a second flow control unit, which is arranged to be operatively displaced by means of being rotated around a second axis of the sprinkler head from a first position to a third position, which opens the flow passage in the second non-activated test state.

Also the valve body may be a flow control unit. Embodiments of the present invention may of course have one or more flow control units of another kind than the ones

described in this text. It is preferred that the valve body is arranged outside of the flow control unit. Naturally, the valve body may be arranged in another way, e.g. inside a flow control unit or the like, e.g. such that the flow control unit encompasses the valve body or the like.

The first axis and the second axis may be the same axis.

One and the same flow control unit may be displaced or rotated (preferably along or around the same axis) both at activation caused by the triggering device and at testing (which e.g. may be performed by means of a testing device and/or manually). This makes it possible that by means of the testing (i.e. without activating the sprinkler head) check if the valve device shows enough movability to be able to be activated by means of the triggering device.

The flow control device may be configured to be operatively activated by a testing unit, so that the flow control device is displaced from the first position to the third position.

The flow control device may be configured to be operatively displaced manually from the first position to the third position.

The flow passage may comprise a plurality of flow passages where at least a first flow passage and a second flow passage run into the same outlet device, or where at least one first flow passage runs into a first outlet device and at least one second flow passage runs into a second outlet device. In this case the valve device may be configured to be operatively held in the first non-activated state by the triggering device, so that the first flow passage and the second flow passage are closed, and configured to in an activated state operatively open the first flow passage when the triggering device has been activated, so that air **114** and fire-extinguishing medium **112** may flow from the inlet device to an outlet device. The valve device may further be configured to in the second non-activated test state operatively open the second flow passage such that air **114** and fire-extinguishing medium **112** may flow from the inlet device through the second flow passage and out through the outlet device.

The exemplifying embodiments described above may also be summarized in the following way:

The embodiments relate to a method for testing sprinkler head. The sprinkler head comprises a valve device, which is held in a first non-activated state by a triggering device in the sprinkler head and closes a flow passage which is configured to lead fire-extinguishing medium **112** and air **114** from a distribution system **110** to an outlet device, which is configured to operatively release air **114** and fire-extinguishing medium **112** from the sprinkler head. The valve device is further configured to in an activated state operatively open the flow passage, when the triggering device has been activated in a heated condition, so that air **114** and fire-extinguishing medium **112** may flow from the distribution system **110** to the outlet device. The method comprises the activity to set the valve device in a second non-activated test state, which opens the flow passage such that air **114** and fire-extinguishing medium **112** may flow from the distribution system **110** via the flow passage out through the outlet device.

The method may comprise the activity to displace at least one flow control device in the valve device from a first position, which closes the flow passage in a first non-activated state to a second position, which opens the flow passage in the activated state, when the triggering device has been activated.

The method may comprise the activity to displace the flow control device from the first position to the second position along a first axis of the sprinkler head.

The method may comprise the activity to displace the flow control device along the first axis from the first position to the third position, which opens the flow passage in the second non-activated test state.

The method may comprise the activity to displace at least one second flow control device in the valve device by means of rotating the second flow control device around a second axis of the sprinkler head from a first position to a third position, which opens the flow passage in the second non-activated test state.

The first and the second axis may be the same axis.

The method may comprise the activity to displace the flow control device from the first position to the third position by means of a testing unit.

The method may comprise the activity to manually displace the flow control device from the first position to the third position.

The valve device may be configured to be operatively held in the first non-activated state by the triggering device, such that a first flow passage and at least one second flow passage are closed, and configured to in an activated state operatively open the first flow passage, when the triggering device is activated, so that air **114** and fire-extinguishing medium **112** may flow from the distribution system **110** via the first flow passage to the outlet device.

The method may comprise the activity to set the valve device in a second non-activated test state which opens the second flow passage such that air **114** and fire-extinguishing medium **112** may flow from the distribution system **110** through the second flow passage and out through the outlet device.

The present invention has now been described with reference to exemplifying embodiments. The invention is however not limited by the embodiments described in this text. On the contrary, the full width of the invention is only determined by the scope of the enclosed patent claims.

The invention claimed is:

1. A sprinkler head comprising

an inlet device configured to operatively lead a fire-extinguishing medium and air from a distribution system into the sprinkler head,

an outlet device configured to operatively release fire-extinguishing medium and air from the sprinkler head,

a flow passage configured to lead fire-extinguishing medium and air from the inlet device to the outlet device,

a valve device configured to operatively be held in a first non-activated state by a triggering device in the sprinkler head, so that the flow passage is closed, and configured to in an activated state operatively open the flow passage when the triggering device is activated in a heated state, so that air and fire-extinguishing medium may flow from the inlet device to the outlet device,

wherein

the valve device is configured to in a second non-activated test state operatively open the flow passage so that air and fire-extinguishing medium may flow from the inlet device through the flow passage and out through the outlet device, wherein the triggering device in the test state is maintained in an unchanged state and an unchanged position in relation to the inlet device and the outlet device,

and wherein the function of the sprinkler head is maintained unchanged during the testing procedure.

2. Sprinkler head according to claim **1**, wherein the triggering device is in the form of a container made of an essentially rigid material and containing a substance which

expands when it is heated, such that said container cracks and collapses, wherein a state of the container is viewable external to the sprinkler head.

3. Sprinkler head according to claim **1**, wherein the valve device comprises at least one flow control device arranged to operatively be displaced from a first position closing the flow passage in the first non-activated state to a second position opening the flow passage in the activated state when the triggering device has been activated.

4. Sprinkler head according to claim **3**, wherein the valve device further comprises a spring device, which together with the triggering device hold the valve device biased in the first non-activated state and in that this spring device is configured to operatively be able to displace the flow control device from said first position closing the flow passage in the first non-activated state to said second position opening the flow passage in the activated state when the triggering device has been activated.

5. Sprinkler head according to claim **3**, wherein the flow control device is arranged to be operatively displaced from the first position to the second position along a first axis of the sprinkler head.

6. Sprinkler head according to claim **5**, wherein the flow control device is arranged to be operatively displaced along the first axis from the first position to the third position, which opens the flow passage in the second non-activated test state.

7. Sprinkler head according to claim **3**, wherein the valve device comprises at least one second flow control unit which is arranged to be operatively displaced by means of being rotated around a second axis of the sprinkler head from a first position to a third position, which opens the flow passage in the second non-activated test state.

8. Sprinkler head according to claim **7**, wherein the first and the second axis is the same axis.

9. Sprinkler head according to claim **6**, wherein the flow control device is configured to be operatively activated by a testing unit such that the flow control device is displaced from the first position to the third position.

10. Sprinkler head according to claim **6**, wherein the flow control device is configured to be operatively displaced manually from the first position to the third position.

11. Sprinkler head according to claim **1**, wherein the flow passage comprises a plurality of flow passages, where at least a first flow passage and a second flow passage different from the first flow passage run into the same outlet device, or where at least one first flow passage runs into a first outlet device and at least one second flow passage runs into a second outlet device, the at least one first flow passage different from the at least one second flow passage.

12. Sprinkler head according to claim **11**, wherein

the valve device is configured to be operatively held in the first non-activated state by the triggering device, so that the first flow passage and the second flow passage are closed, and configured to in an activated state operatively open the first flow passage when the triggering device has been activated, so that air and fire-extinguishing medium may flow from the inlet device to an outlet device, and wherein

the valve device is configured to in the second non-activated test state operatively open the second flow passage such that air and fire-extinguishing medium may flow from the inlet device through the second flow passage and out through the outlet device.

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